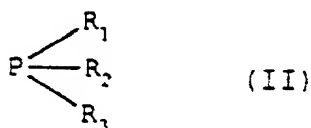


## CLAIMS

1. Method for treating keratinous hair fibres to endow them with novel appropriate properties, characterized in that it comprises steps consisting in reducing the disulphide bonds of the hair keratin with a view to generating reactive sites only on the surface of said fibres to a depth of less than 10  $\mu\text{m}$  and in covalently fixing at least one active compound which is capable of endowing the keratinous hair fibres with novel appropriate properties on said reactive sites, said active compound comprising at least one reactive function which is capable of reacting with said reactive sites formed on the surface of the keratinous fibres.
2. Method according to Claim 1, characterized in that in a first step, the disulphide bonds of the keratin are reduced and in that, after optional rinsing with water, a second step is then carried out in which the active compound is fixed.
3. Method according to Claim 1, characterized in that reduction of the disulphide bonds of the keratin is carried out simultaneously with fixing of the active compound.
4. Method according to any one of the preceding claims, characterized in that reduction is carried out to a depth of about 4 to 5  $\mu\text{m}$ .
5. Method according to any one of the preceding claims, characterized in that reduction is carried out to generate 0.1% to 5% by weight of cysteine with respect to the total amino acids of the keratinous hair fibres.
6. Method according to Claim 5, characterized in that reduction is carried out in order to generate 0.1%

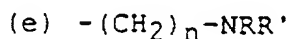
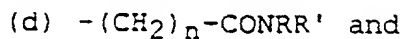
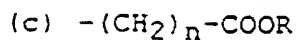
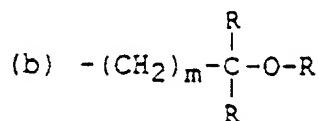
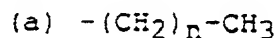
to 2% by weight of cysteine with respect to the total amino acids of the keratinous hair fibres.

7. Method according to any one of the preceding claims, characterized in that the disulphide bonds of the keratin are reduced using a reducing agent selected from thiols, hydrides, sulphites or bisulphites, phosphines and phosphites, hyperbranched polymers and dendrimers carrying terminal thiol functions.
8. Method according to claim 7, characterized in that the reducing agent is a phosphine with general formula:



where:

$R_1$ ,  $R_2$  and  $R_3$ , which are identical, represent:



$n = 1$  to  $3$

$m = 0$  or  $1$  to  $3$

$R$  and  $R'$ , which may be identical or different, represent a hydrogen atom or a linear or branched  $C_1$ - $C_4$  alkyl radical and salts of said compounds with formula (I) with a mineral or organic acid.

9. Method according to Claim 8, characterized in that the phosphine salts with formula (I) are selected from hydrochlorides, hydrobromides, sulphates, citrates, oxalates and acetates.
- 5 10. Method according to any one of Claims 10 to 12, characterized in that the phosphine is selected from tris(2-carboxyethyl)phosphine and tris(hydroxymethyl)phosphine.
11. Method according to any one of Claims 10 to 13, characterized in that the phosphine is present in a concentration in the range  $10^{-3}$  M to 1 M.
- 10 12. Method according to any one of the preceding claims, characterized in that the pH of the reducing agent composition is in the range 3 to 9, preferably in the range 4 to 7.
- 15 13. Method according to any one of the preceding claims, characterized in that the contact time for the aqueous reducing agent solution with the keratinous fibres is in the range from about 30 seconds to 1 hour, the temperature being in the range from room temperature to a temperature of less than 60°C.
- 20 14. Method according to any one of the preceding claims, characterized in that the active compound is selected from colorants, sunscreens, shine agents and hydrophobic compounds, said active compound carrying at least one nucleofugic function.
- 25 15. Method according to any one of the preceding claims, characterized in that the active compound is used in an aqueous solution at a concentration in the range from about  $10^{-3}\%$  to 20%, the pH of said solution being in the range from about 2 to 10.
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16. Method according to any one of the preceding claims, characterized in that the contact time for the aqueous solution of active compound is generally in the range from about 1 minute to 1 hour, the temperature being in the range from room temperature to a temperature of less than 60°C.

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